# ENTOMOLOGICAL NEWS


## OCTOBER. 1936

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HENRY CHRISTOPHER MCCOOK,
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# ENTOMOLOGICAL NEWS

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## Flight-Stridulation in American Acridians. (Orthop.: Acrididae).

By F. B. ISELY, Trinity University, Waxahachie, Texas.

In 1908 Karny [1] experimentally demonstrated the fact that in a number of European acridians, only the hind wings are used in making flight noises. In commenting on Karny's experiments, Uvarov [2] suggests "that the sound results from the fan-like opening and closing of the wing during flight; there is no need for the wing to close altogether (this does not happen), as the sound may be produced by the partial slackening of the membrane between the veins and the subsequent sudden expansion."

Current American authors, however, Blatchley,[3] and Comstock and Herrick,[4] Curtis and Guthrie,[5] and many others still hold to the theory that during the flight certain species "rub together the upper surface of the front edge of the hind wings and the under surface of the wing-covers" and that this friction results in a crackling sound.

Morse,[6] Allard,[7] and Snodgrass [8] on the other hand, express doubt as to just how the flight-noises are produced.

The literature on orthopteran musicianship is fairly volum-

[1] H. Karny, Uber das Schnarren der Heuschrecken. *Stett ent. Ztg.* 49: 112-119, 1908.

[2] B. P. Uvarov, Locusts and Grasshoppers. Imperial Bureau of Entomology, pp. 30-31, 1928.

[3] W. S. Blatchley, Orthoptera of Northeastern America, pp. 188-89, 1920.

[4] J. H. Comstock, A. B. Comstock, and G. W. Herrick, Manual for the Study of Insects, p. 56, 1931.

[5] W. C. Curtis and Mary J. Guthrie, Textbook of General Zoology, p. 447, 1933.

[6] A. P. Morse, Orthoptera of New England, pp. 239-40, 1920.

[7] H. A. Allard, "Our Insect Instrumentalists and Their Musical Technique." *Ann. Rep't. Smithsonian Inst.*, p. 568, 1928.

[8] R. E. Snodgrass, "Insect Musicians, Their Music and Their Instruments." *Ann. Rep't. Smithsonian Inst.*, pp. 411-12, 1923.

inous. Allard, Fulton, and Snodgrass, in a number of special papers, have given attention to the technique of these musical instrumentalists, especially the Tettigoniidae (katydids, coneheads, meadow grasshoppers) and the Gryllidae (crickets).

The sawing, strumming, snapping notes of the acridians (short-horn grasshoppers) have received less attention than the "fiddle-bow" music of the tettigonids and the gryllids. However, as far as the technique of flight-stridulation is concerned, the snapping, whirring, crepitating, crackling, clattering, rattling, clacking noises, when explained by American writers, are explained as cited above.

While an audible wing flutter is frequently made by many acridian species, flight-singing is perfected among a number of the "band-winged locusts," the Oedipodinae. Some of the Oedipodinae appear to crepitate only at the flight take off, others at the landing, some while hovering in mid air, and still others rattle during the entire period of their flight. Usually only the males are active in making stridulous calls, and these noise-making activities appear to be entirely voluntary and under the control of the individual while in flight.

The "Snapping Locust," *Circotettix verruculatus* (Kirby) is the premier stridulator of the Northeastern United States.[9] It is, however, in the Rocky Mountain region that we have a number of our most conspicuous "Cracker Locusts." *Circotettix rabula rabula* Rehn and Hebard is the species found in the lower mountain altitudes up to timber line, but above timber line *Circotettix rabula altior* Rehn is the dominant flight stridulator.[10] On a number of occasions in various parts of the Colorado Rockies, I have observed these rattlers holding their resounding canyon carnivals.

The musical performance of *Circotettix rabula rabula* is quite spectacular, and its "clatter" may be heard for over a quarter of a mile. On a warm sunshiny day a disturbed male may mount into the air to an elevation of thirty or forty feet.

[9] A. P. Morse, Orthoptera of New England, p. 479, 1920.

[10] Morgan Hebard, The Orthoptera of Colorado. *Proc. Acad. Nat. Sci.*, Philadelphia, lxxxi: 363, 1929.

Weaving up and down in zigzag flights, he gives forth a reverberating clicking and snapping which varies in volume with each repeated upward bound. This individual sing-song often serves as a signal for other male *C.r. rabula* rattlers to join in what soon may become a far reaching canyon chorus.

The fact that resting out-of-sight individuals of the same species take spontaneously to the air in response to the flight song or rattle of another individual of the same species, that has been put to flight by the movements of a field observer, clearly suggests that auditory stimulation and response actively functions among these grasshoppers. This auditory response behavior can be satisfactorily demonstrated by those who study these insects as they live under out-of-door conditions. It seems to me that this behavior satisfactorily answers affirmatively the query as to whether or not these acridians actually hear.

In Texas, as far as I have observed, the only really noisy flight stridulator is *Circotettix rabula nigrifasciatus* Beamer. This species I have found in the rugged, broken, cap-rock hills of the Texas Panhandle.[11] It is worthy of note that the loudest crepitators among the acridian flight stridulators are associated with rugged topography, i.e. bad lands, jagged ravines, boulder covered mountain sides, etc. Timber margin stridulators as a rule are more noisy than species on the open prairies or plains.

There are twenty-two species among the Oedipodinae within Northeastern Texas.[12] While many of these make flight noises, none of them take front rank as flight singers, and only a few of the genera *Arphia* and *Spharagemon* qualify as fair crepitators.

Recently while working with two of my students on the technique of Orthopteran musicians,[13] it occurred to me that it would be worthwhile to test the Karny-Uvarov explanation of

[11] F. B. Isely, "Field Notes on Texas Orthoptera." ENTOMOLOGICAL NEWS, xlv: 6-7, 1934.

[12] F. B. Isely, "Acridian Researches Within Northeastern Texas" (Orthoptera). ENTOMOLOGICAL NEWS, xlvi: 69-71, 1935.

[13] E. L. Dunaway and Jean Wilson, "Orthopteran Musicians, Their Sending and Receiving Instruments." *1935 Abstracts, North Texas Biological Society*, p. 1, 1935.

flight sound production among the European acridians, against the current explanation of American authors, cited above, as to the technique of noise-making by our acridians during flight.

## Experimental Tests.

Accordingly, during the past summer, I have on several occasions undertaken to test experimentally the relation of the tegmina to flight and to flight-stridulation. The usual testing method is to visit favorable habitats of the desired species, capture a number of actively stridulating males, and carefully clip at their bases the tegmina or fore wings of a number of these specimens. Operated specimens and controls should not be crowded while they are being held for experimental testing. Also one can not expect to get the best results with specimens that are kept long in captivity or have been exhausted by experimentation. For that reason I have usually carried on observations with specimens very soon after they are captured and operated upon.

For testing, operated and control individuals of the same species may be liberated, preferably in an open area, where their flight and stridulating activities may be observed. In this way one may make comparisons both as to flight and as to flight-stridulation.

Seven species, *Arphia simplex* Scudder, *Spharagemon collare cristatum* (Scudder), *Spharagemon equale* (Say), *Chortophaga viridifasciata* (DeGeer), *Encoptolophus sordidus costalis* (Scudder), *Hadrotettix trifasciatus* (Say), *Hippiscus rugosus* (Scudder), have been thoroughly checked and a number of other species more or less incidentally. In these species the hind wing expanse is comparatively large and the main veins of these wings are strongly thickened. All tests clearly show that the tegmina are unnecessary to flight noises.

As would be expected, the removal of the fore wings definitely impairs directed and controlled flight. However, operated specimens of all the seven species listed are capable of hop flights, and *S. equale* and *H. trifasciatus* fly with fair directness fifteen to twenty feet.

As far as flight-stridulation is concerned, in several cases noise-making is more apparent with operated specimens, that is to say, with the tegmina removed than with normal specimens. This is probably due to the fact that the hind wings are more vigorously used in operated specimens in trying to fly due to the absence of the fore wings. It is fair to say that in most instances the flight song of the operated specimens is characteristic of the species.

### Other Experimenters.

H. A. Allard of Washington D. C. and Gordon Alexander of the University of Colorado have recently experimented with acridian flight stridulators.

Mr. Allard writes: "I have kept your suggestion in mind and on a recent collecting trip in the Bull Run Mountains of Virginia I made some experiments along the lines you suggested. The grasshopper *Spharagemon bolli* was common and actively producing its crepitations along the wooded cart-roads. I captured a number of males of this species, carefully clipped off their fore wings, or tegmina, and allowed them to fly. As you have observed with other flight stridulators, these were able to fly fairly well with the tegmina removed and produced the characteristic snapping sound which they commonly make in flight. These crepitations, however, seemed to be somewhat less controlled than before. In addition to the males, I captured a female, clipped off her tegmina and gave her freedom to fly. She also produced an audible rustle without the upper wings.

There is not any doubt but that these flight "singers" can produce their characteristic sounds even when the tegmina are removed. I think it is plain enough that the wing covers need not be concerned with the flight crepitations that one hears."

Dr. Alexander reports under date of October 15, 1935: "I have carried out your experiments on four species of local Oedipodinae. These were: *Circotettix rabula rabula* R. & H., *Trimerotropis suffusus* Scudder, *Trimerotropis cincta* (Thomas), and *Arphia pseudonietana* (Thomas). These are among our noisiest and most persistent stridulators.

The experiments were carried out in the field,—all specimens

used having been collected after being heard "rattling" during flight. In each species, a specimen or more were prepared by having the tegmina cut off. When these were released they all made the rattling noise in flight. In every case the results were the same.

I also tried an additional experiment using a large pinning forceps of dental steel. I compressed the wings, a little bit at a time, from the base to the outer margin. This crushed the veins so that they lost their stiffness and the whole wing became flabby. When such specimens were released, they could fly about as well as before but did not make the rattling sound. Additional specimens were tried out with the tegmina intact but with the veins in the wings crushed. These fly quite well (one of them got clear away from me), but they did not make the rattling sound in any case which I tried. This additional experiment was tried with all four species named above, and in all cases the specimens flew fairly well—but without making the rattling noise. Incidentally, the crushing of the veins prevents the insect from folding the wings in pleats. At rest, the wings protrude from beneath the edge of the tegmina.

The first three species above were collected and studied in the upper end of Gregory Canyon, elevation 6,800 feet; the *Arphia* was caught in our yard at Boulder."

## Discussion.

Snodgrass [14] has shown that the third axillary sclerite and its muscles constitute the motor elements in the flexor movements of the hind wings of acridians. He further points out that there are two independent wing movements—flight movements and flexion-extension movements. It is in this flexor-extensor mechanism, i.e. the rapid and independently executed fan-like opening and closing or even partial opening and closing of the hind wings, that we find an efficient stridulatory mechanism and the real source of flight noises. In fact this flexor-extensor apparatus seems to be specifically adapted for making controlled and directed flight music.

[14] R. E. Snodgrass, "How Insects Fly." *Ann Rep't. Smithsonian Inst.*, pp. 397, 410, 1929.

In short, Karny's 1908 findings apply to American acridians as well as European acridians. The flexor-extensor mechanism of the hind wings with their rapid fan-like folding and closing produces the stridulous flight songs. Field behavior of a number of acridian species supports the conclusion that flight noises are heard and responded to by other individuals within the species concerned.

To summarize:

1. The tegmina are not concerned in flight-stridulation.
2. Acridian flight noises emanate from the hind wings, and require stiff veins for their production.
3. There is a definite correlation between the volume of flight songs and the topography of the habitat.
4. Grasshoppers hear and react to flight crepitations.

## A New Bee of the Genus Coelioxys from Nebraska (Hymenopt.: Megachilidae).

By Roscoe E. Hill, University of Nebraska, Lincoln.

**Coelioxys bisoncornua** new species.

♀. Length 12-14 mm. Black, with all of the legs except the coxae dark red, venter and extreme lateral edges of abdominal tergites more or less obscurely reddish.

Clypeus opaque, finely rugose, its apical margin bidentate, almost bare except for a thin ochreous apical fringe and a similar though less evident fringe of short hair about the epistomal suture. Supraclypeus and face similarly but more finely sculptured, with a faint carina between antennae which bifurcates to throw the anterior ocellus into a slight depression. Face thinly clothed with short appressed, yellowish white hair. Vertex comparatively bare, each of the strong dense punctures with an inconspicuous minute hair in its center, punctures fine back of ocelli but rather coarse and crowded laterally, a small opaque impunctate spot contiguous to superior orbital margin. Eyes green with very short hair. Antennae black, joint 3 longer than 4 and twice as long as 2. Mandibles dark reddish with black teeth. Cheeks coarsely punctured and moderately clothed with short white hair, anterior margin carinate.

Mesoscutum punctured like sides of vertex, a little less densely so on disk. Scutellum densely rugose, prominently angulated behind, the rugose lateral spines moderate in length

and broad, their points incurved so as to resemble a pair of bison horns. Propodeum opaque, finely rugose, enclosure satiny and minutely rugose, the sides of the propodeum angled and clothed with long, rather dense, shaggy, white hair. Mesopleura punctured like mesoscutum, their anterior margins carinate, all margins bounded by thin whitish hair lines which join under the tegulae to form a hair spot behind the dark testaceous and well-developed lateral pronotal carinae. Mesoscutum practically bare, without lines or spots of squamose hairs, except a short line behind tegulae, the anterior margin with a rather thin fringe of short, erect, pale ochreous hair. Mesoscutellar suture with two spots of white appressed hairs and a similar fringe along the posterior margin of the scutellum. Metanotum with a dense fringe of long, erect, whitish hair. Tegulae ferruginous.

Wings hyaline, brownish, becoming clouded apically, nervures and stigma dark brown, basal nervure meeting transverso-medial, first recurrent nervure meeting second submarginal cell about same distance from base as second recurrent nervure from apex. Legs with short white pubescence, that on the tarsi within golden.

Abdomen slightly shiny, strongly punctured; the punctures on tergite 1 very close and rather fine; tergites 2 and 3 more coarsely punctured, those anteriad of the entire and hairless sulci close, posteriad of the sulci punctures are more remote and with very minute punctures interspersed among the larger ones, especially so on disk; tergite 3 with a shining, minutely punctured, otherwise impunctate, transverse band on disk posteriad to sulci; tergites 4 and 5 shiny, without sulci and with coarse punctures uniformly separated for about the width of one; tergite 6 finely and densely punctured, broad at base and gradually narrowed to tip which is broadly rounded, a fine longitudinal carina running about two-thirds its length, on either side of which the tergite is deeply depressed at apex, a broadly rounded, though slight, lateral projection on each side near apex which is not reflexed. Tergites 1-5 with narrow, entire apical fasciae of squamose, white hairs, but without basal bands. Sternites 2-5 subapically with a more or less distinct transverse red line. Sternites 1-4 uniformly and coarsely punctured; sternite 5 with coarse punctures which are slightly more dense at apex; sternite 1 with a median white hair spot, but no apical margin, apices of 2-5 with thin entire hair bands. Apical sternite slightly longer than apical tergite, broad and gradually narrowed to near apex, where it is emarginated almost at a right

angle to form a narrow, more or less acute, apical projection, the punctures coarse and somewhat more close and elongate apically, a median carina running over half its length, the margins of the sternite finely pale ciliate.

♂. Length 11-13 mm. Like ♀ except that clypeus and face below antennal level is covered with a dense mat of appressed silvery hairs, the vertex subuniformly and somewhat more finely punctured, first recurrent nervure meeting second submarginal nearer base than second from apex, tergites 2 and 3 with entire sulci, those on 4 and 5 medially interrupted, tergite 4 less closely and tergite 5 more closely punctured, the sternum without the distinct red lines. Sulci on tergites 3-5 with medially interrupted hair fasciae, that on 2 without hair. Cheeks below broad and without a beveled or grooved area. Anterior coxae with short inconspicuous spines. Apical tergite closely punctured and with a basal hair band, its apical margin truncate, angularly slightly produced and feebly emarginate medially at the tip, below which is a short, broad, blunt terminal spine on each side, the extreme sides with longer, sharper, curved spines, segment 7 showing ventrally as a conspicuous hairy spine. Tergite 5 without lateral spines. Tergite 2 without foveae. Sternite 4 entire.

*Holotype.:* Halsey, Thomas County, NEBRASKA, August 9, 1912, on *Helianthus petiolaris* (J. T. Zimmer), ♀. *Allotype:* Gordon, Sheridan county, NEBRASKA, August 29, 1905, on *Helianthus petiolaris* (D. E. Winchester), ♂. *Paratypes:* Lincoln, NEBRASKA, August, 1 ♂; Neligh, Nebraska, August (M. Cary), 1 ♂; Blue Rapids, KANSAS, September 12, 1908, on *Helianthus grosseserratus* (O. A. Stevens, N. 1127), 1 ♀.

The male from Neligh differs from the other two males in the wing venation, agreeing with the females in this respect. The female from Blue Rapids, Kansas, does not have the distinct narrow transverse red lines on the sternum; otherwise it agrees with the holotype.

All the above specimens are in the permanent collection of the University of Nebraska at Lincoln.

The general aspect of this handsome species is much like that of *C. edita* Cresson ( = *deplanata* Cresson), to which it is most closely related, but from which it may easily be separated by its prominently angulated scutellum (rounded behind in *edita*), the complete lack of the line of appressed squamose

hairs dilated into two spots on anterior border of the mesoscutum and the similar line on posterior margin of the scutellum which are so conspicuous in *edita*, the darker red legs, the narrower fasciae, the presence of the minute punctures on tergites 2 and 3, the more poorly developed occipital fringe (well developed in *edita*), the more deeply apically depressed sixth tergite, the more uniform puncturation of the penultimate sternite (punctures much finer and close on apical third than at base in *edita*), and other differences. From *C. sculptifrons* Crawford in the generally closer abdominal puncturation, especially on tergites 2 and 3 apicad of the transverse sulci, the much closer puncturation of tergite 6 (in *sculptifrons* the punctures are over a puncture width apart basally), the subuniformly coarsely and rather closely punctured sternite 5 (in *sculptifrons* this is coarsely punctured basally but minutely and very closely punctured apically), the bidentate apical margin of the clypeus (clypeus with 5 short apical teeth in *sculptifrons*), and other differences. From *C. rudis* Cockerell it is known by the wholly red femora (basal half black in *rudis*), the lack of the subapical impunctate band on the first tergite, the dentate margin of the clypeus (straight and simple in *rudis*), and other characters. Aside from *edita, sculptifrons,* and *rudis* the character of the apical segment and the red legs will distinguish it from our other species of the genus. The bispinose tip of tergite 6 in the male distinguishes it from *C. edita* as well as all other allied species.

## A New Robber Fly, with a Key to the Species of Callinicus and Chrysoceria. (Diptera: Asilidae).

By J. Wilcox, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

The genera *Callinicus* Loew and *Chrysoceria* Williston are separated from the remainder of the Dasypogoninae that lack a terminal claw-like spur on the fore tibiae by the presence of a pair of stout, inwardly directed spines at the apices of the middle tibiae. The species here described appears to link these two genera and unless some structural character can be found

to separate them, there seems to be no reason for retaining *Chrysoceria.*

KEY TO THE SPECIES.

1. Abdominal segments 2-5 largely bright yellow pollinose, the remainder of these segments shining black; wings hyaline, the anterior crossvein before the middle of the discal cell. (*Chrysoceria*) ..... 2

   Abdominal segments 2-5 largely shining brownish or yellowish red, at most the posterior margins pollinose; wings yellowish or brownish, the anterior crossvein at or beyond the middle of the discal cell (*Callinicus*) ..... 3

2. Femora black; central stripe of the mesonotum extending to the scutellum and confluent with the intermediate postsutural black spots, the presutural black spots extending to the lateral margins and to the humeri; only segments 1-5 of female abdomen pollinose; length 11-15 mm. (Oreg., Wash., Calif., Mont., Wyo.) ..... *pollenia* Cole

   Femora yellow; central stripe of mesonotum not reaching the scutellum and not confluent with the postsutural spots, the presutural spots small and broadly separated from the lateral margins and humeri by golden pollen; segments 1-6 of female abdomen pollinose; length 10-14 mm. (Calif., Ariz., Utah) ..... *pictitarsis* Bigot

3. The abdomen yellowish red, the first segment and male segments 2-6 and female segments 2-5 with posterior golden pollinose fasciae; wings yellowish; length 13-17 mm. (Calif.) ..... *vittatus,* new species

   The abdomen reddish-brown, the sides of the first segment and the small posterior corners of male segments 2-5 and female segments 2-4 yellowish-gray pollinose; wings brownish; length 13-19 mm. (Calif.) ... *calcaneus* Loew

**Callinicus vittatus** n. sp.

♂. Length 16 mm. Head densely golden pollinose and pilose, the palpi and proboscis shining black. Antennae yellowish, the third joint apically and the style black; first two joints subequal in length and yellow haired; the third joint one and three-fourths times the length of the first two joints together; the style one-fifth the length of the third joint and with a minute apical bristle.

Mesonotum and scutellum yellowish in ground color, the central stripe and the intermediate spots black; densely yellowish pollinose, the central stripe and the transverse suture medially grayish pollinose, the intermediate spots dull black. Numerous hairs and bristles golden. Pleurae black in ground color,

the coxae yellowish, both densely yellowish pollinose and pilose, the hairs of the coxae yellowish white.

Abdomen and genitalia shining yellowish red, segments 1-6 with posterior golden pollinose fasciae, these fasciae entire on segments 1-5 but somewhat narrowed at the middle, the rather numerous hairs yellowish.

Legs light yellowish red, the hairs and bristles golden; claws black, the bases reddish; pulvilli light brown; empodium reddish; middle tibiae with a pair of stout, apical, inwardly directed spines.

Halteres yellowish. Wings yellowish, the costal cell quite densely so, veins golden, brownish apically and posteriorly.

♀. Length 17 mm. Very similar. The third antennal joint missing. The thorax greased, in this condition the median and intermediate spots of the mesonotum plainly black. Segments 1-5 of abdomen with entire posterior pollinose fasciae, segments 6-8 bare of pollen.

*Holotype:* ♂, Sequoia National Park, CALIFORNIA, Potwisha, elevation 2,000-5,000 feet, VI-20 '29 (E. C. Van Dyke); in the California Academy of Sciences. *Allotype:* ♀, same data, V-28 '29; in the California Academy of Sciences. *Paratype:* ♂ (length 13 mm.), same data, VI-13 '29; in the writer's collection.

## Notes on Intermountain Aphids[1]

By G. F. KNOWLTON and C. F. SMITH.

The following report deals largely with aphids infesting range and forest plants in Utah and Idaho. Unless otherwise indicated, collections are in Utah and by the writers.

CINARA LASIOCARPAE (G. and P.). On *Abies lasiocarpa*, summit of Logan Canyon, June 10, 1934 (T. O. Thatcher).

C. FORNACULA Hottes. A male, Navajo Lake, Utah, June 16, 1935, appears to be of this species (Det. M. A. Palmer).

C. FERRISI (Swain). A slide, received through the courtesy of Professor M. A. Palmer, was collected by Paul Rice at Moscow, Idaho, July 21, 1931.

[1] Contribution from the Entomology Department, Utah Agricultural Experiment Station. Authorized for publication.

C. GLEHNA (Essig). On *Picea pungens,* River Heights, June 15, 1935 (Thatcher).

PERIPHYLLUS UTAHENSIS (Knlt.). On *Salix* at Rexburg, Idaho, June 23, 1935; *Alate vivipara.*—Antennal III, 0.47 to 0.51 mm., with 6 to 11 sensoria; IV, 0.235 to 0.28, with 1 to 4 sensoria; V, 0.17 to 0.22; VI, 0.09 + 0.14 to 0.11 + 0.18 mm. *Apterous vivipara.*—Antennal III, 0.34 to 0.47 mm.; IV, 0.14 to 0.22; V, 0.11 to 0.12; VI, 0.078 + 0.125 to 0.11 + 0.14 mm. Because of the greater relative length of the unguis as compared with the base of antennal VI, the greater development of antennal segments III and IV, and the conspicuous difference in relative lengths of antennals IV and V of alates, the writers consider this material to be *P. utahensis* rather than *P. macrostachyae* (*Essig*). Also Riverdale and Cleveland, Idaho, September 1, 1935. On *Salix,* Harrisville, June 24, 1935; Hooper, June 3, 1935, in Utah.

P. MACROSTACHYAE (Essig). On *Salix,* Currant Creek, August 16, 1935; Harrisville, June 3, 1935.

PTEROCOMA POPULEA Kalt. On *Populus,* Cowley Canyon, May 16, 1934; Evans, May 13, 1930; Hyde Park; Lark, October 3, 1935; Logan Canyon; Paradise; Salt Lake City, in Utah. Also Rexburg, Idaho, June 23, 1935.

CLAVIGERUS SMITHIAE (Monell). On *Populus,* Grouse Creek, September 28, 1935; Lark, October 3, 1935, in Utah. Also on *Populus* and *Salix* at Rexburg, Idaho, June 23, 1935.

**Bipersona hottesi** n. sp. *Apterous vivipara.*—Size 2 to 2.5 mm. long; ocular tubercles well developed; antennae pale to dusky; antennal III, 0.82 mm. long, without sensoria; IV, 0.59 to 0.62; V, 0.45 to 0.5; VI, 0.14 + 0.73 to 0.78 mm. long; rostrum exceeding second coxae; rostral IV + V, 0.16 to 0.19 mm. long; hind tibiae 2.25; hind tarsi 0.14; cornicles dark, 0.67 to 0.84; cauda pale to dusky, having a much twisted appearance, hard median portion 0.27 and total length 0.41 mm.

*Habitat:* Upon wild rose, *Rosa* sp., Big Cottonwood Canyon, Utah, June 29, 1925 (Knowlton). *Type* slide in collection of senior author.

*Taxonomy. Bipersona hottesi* differs from *B. torticauda* (Gill.) in lacking secondary sensoria on antennals III and IV,

in having a shorter rostral IV + V, in possessing blunt to apically enlarged hairs on head and antennae, and in only apical end of hind tibiae being dark.

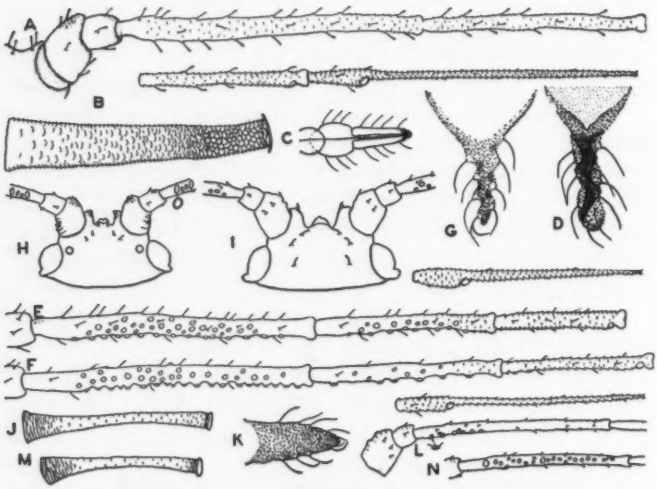


Fig. 1. *Bipersona hottesi* n. sp. Apterous, A to D. *Bipersona torticauda. Apterous,* E, G; alate F. *Macrosiphum zerozalphum.* Apterous, I, J, L; alate H, K, M; N.

B. TORTICAUDA (Gillette). On thistle, Tooele, Utah, June 15, 1915 (C. P. Gillette). The identified slide was secured through the courtesy of Professor M. A. Palmer.

MACROSIPHUM AMBROSIAE (Thos.). On marsh elder, Bozeman and Manhattan, Montana, August 14, 1926 (C. B. Philip). Rexburg, Idaho, June 23, 1935.

M. COWENI (Hunter). In stomach of a lizard, *Sceloporus g. graciosus* at Iosepa, Skull Valley, October 2, 1932; on *Artemisia tridentata,* Ash Creek Canyon, April 25, 1935; Hurricane; Mueller Park; Parley's Canyon, in Utah. Also Winder, June 9, 1935; and Stone, Idaho, May 19, 1930.

M. DIRHODUM (Walk.). On *Rosa,* Blacksmith Fork Canyon, July 18, 1925; Hooper, June 3, 1935; Logan, October 12, 1929; Lake City, July 28, 1926. Also Bozeman, Montana, August 15, 1926 (Philip).

M. ERIGERONENSIS (Thos.). On *Grindelia squarrosa,* Bozeman, Montana, August 17, 1926 (Philip).

M. PACKI Knlt. On *Chrysothamnus,* usually *nauseosus,* Beaver, May 3, 1934; Cedar; Cedar City; Clover, October 2, 1932; Glendale, June 27, 1933; Indian Canyon, June 12, 1933; Pintura, May 1, 1934; Riverdale. Also Elk Springs, Colorado, August 18, 1935 (Knowlton).

M. PISI (Kalt.). On alfalfa, Green River, Utah, March 5, 1935. Logandale and Overton, Nevada, April 26, 1935.

M. PSEUDOROSAE Patch. On wild rose, Amalga; City Creek and Emigration Canyons, June 21, 1925; Big Cottonwood Canyon, June 29, 1925; Granite, June 6, 1935; Utah. Also Emigration Canyon, Idaho, June, 1925.

M. ROSAE (L.). On *Rosa,* Mapleton and Provo, Utah, June 7, 1935. Overton, Nevada, April 25, 1935. Puyallup, Washington, August 27, 1932 (A. J. Hanson).

M. SPORADICUM Knlt. Cedar Valley, on *Chrysothamnus,* June 13, 1935; Dunbar, September 12, 1935.

M. TARAXACI (Kalt.). Mink Creek, Idaho, July 7, 1935, on dandelion. Puyallup, Washington, July 16, 1933 (A. J. Hanson).

M. ZEROZALPHUM Knlt. This yellowish green aphid occurs upon filaree, *Erodium cicutarium.* Winged and wingless females were collected in Utah at Bountiful, Salt Lake City, and Murray, on May 2, 1927, and at Leeds on April 25, 1935. Wingless viviparae were collected at Brigham and Deweyville, April 28, 1927; at Penrose, June 3, 1930; and at Santa Clara, June 25, 1935.

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**Neotropical Aeshnas Wanted (Odonata).**

The undersigned has well on the way a Synopsis of the Neotropical species of the genera Aeshna, Coryphaeschna and perhaps some allies, to be illustrated by figures of the genitalia, terminal abdominal structures, patterns of the top of the frons

and of the thorax. He will be glad to have the privilege of examining material of the groups indicated (to be returned to their owners), especially of such species as *brevifrons, castor, colorata, coronata, dugesi, haarupi, intricata, joannisi, litigatrix, peralta, rufipes, unicolor, variegata* and *williamsoniana,* and of *Subaeschna* and *Limnetron;* or to identify material of these four genera for a moderate return in duplicates, or to purchase desirable material thereof. Fullest data on localities and dates of capture are especially desired. Each sender of such specimens will receive a copy of the published Synopsis. PHILIP P. CALVERT, Zoological Laboratory, University of Pennsylvania, Philadelphia, Pennsylvania, U. S. America.

## Notice of Possible Suspension of Rules of Nomenclature in Certain Cases.

Attention of the zoological profession is invited to the fact that request for the "Suspension of the Rules" has been made in the following cases, on the ground that "the strict application of the Règles will clearly result in greater confusion than uniformity." According to procedure one year's notice is hereby published, "making it possible for zoologists, particularly specialists in the group in question, to present arguments for or against the suspension under consideration."

Note A.—Suspend rules.

Note B.—Insert in Official List with the type as given in parentheses.

INSECTA.—The so-called "Erlangen List" of 1801 to be suppressed.

ORTHOPTERA.—*Locusta* Linn., 1758 (*Gryllus Locusta migratorius* Linn., 1758); *Phaneroptera* Serville, 1831 (*Gryllus falcatus* Poda, 1761); A, B.

HYMENOPTERA.—*Cimbex* Olivier, 1790 (*Tenthredo lutea* Linn., 1758); A, B. *Crabro* Fabricius, 1775 (*Sphex cribraria* Linn., 1767); A, B. *Lasius* Fabricius, 1805 (*Formica nigra* Linn., 1758); A, B. *Anthophora* Latreille, 1803 (*Apis pilipes* Fabr., 1775); A. B. *Ichneumon* Linn., 1758 (*Ichneumon extensorius* Linn., 1758); A, B. *Pimpla* Fabr., 1804 (*Ichneumon instigator* Fabr., 1793); A, B. *Ephialtes* Gravenhorst, 1829 (*Ichneumon manifestator* Linn., 1758); A, B. *Bracon* Fabr., 1805 (*Bracon minutator* Fabr., 1798); A, B. *Pompilus* Fabr., 1798 (*Pompilus pulcher* Fabr., 1798); A, B. *Bethylus* Latreille, 1802 (*Omalus fuscicornis* Jurine, 1807); A, B.

*Prosopis* Jurine, 1807 (*Sphex signator* Panzer, [1798]); A, B. *Ceraphron* Jurine, 1807 (*Ceraphron sulcatus* Jurine, 1807); A, B. *Torymus* Dalman, 1820 (*Ichneumon bedeguaris* Linn., 1758); A, B. *Proctrotrupes* Latreille, 1796 (*Proctotrupes brevipennis* Latreille, 1802); A, B. *Sphex* Linn., 1758 (*Sphex flavipennis* Fabr., 1793); A, B. *Ammophila* Kirby, 1798 (*Sphex sabulosa* Linn., 1758); A, B.

LEPIDOPTERA. — In interpreting the generic names assigned by Freyer in his *Neuere Beiträge zur Schmetterlingskunde* to the species there described, each species is to be regarded as having been described by Freyer as belonging to the genus cited by him at the head of each description and not to the genus with which he actually associated the specific name. For example, Freyer described, under the genus *Hipparchia* Fabricius, a species to which he gave the specific name *eriphyle*, and which he proceeded to name *Papilio eriphyle* Freyer. Freyer is to be deemed to have described this species under the name *Hipparchia eriphyle* and not under the name *Papilio eriphyle*. A.

*Potamis* Hübner, *Rusticus* Hübner, and *Mancipium* Hübner to be suppressed in favor of *Morpho* Fabr., *Helicopis* Fabr., and *Pontia* Fabr.; A.

LEPIDOPTERA (RHOPALOCERA). — *Euploea* Fabr., 1807 (*Papilio corus* Fabr., 1793); A, B. *Satyrus* Latreille, 1810 (*Papilio actaea* Esper, [1780]); A, B. *Argynnis* Fabr., 1807 (*Papilio paphia* Linn., 1758); A, B. *Vanessa* Fabr., 1807 (*Papilio atalanta* Linn., 1758); A, B. *Euthalia* Hübner, [1823] (*Papilio lubentina* Cramer, 1777); A. B. *Nymphidium* Fabr., 1807 (*Papilio caricae* Linn., 1758); A, B. *Colias* Fabr., 1807 (*Papilio hyale* Linn., 1758); A, B.

Species in parentheses are to be declared the types: *Lycaeides* Hübner, [1823] (*Papilio argyrognomon* Bergstrasser, 1779); A. *Agriades* Hübner, [1823] (*Papilio glandon* Prunner, 1798); A. *Polyommatus* Latreille, 1804 (*Papilio icarus* Rottemburg, 1775); A. *Euchloë* Hübner, [1823] (*Euchloë ausonia* Hübner var. *esperi* Kirby, 1871). *Princeps* Hübner, [1807] and *Orpheides* Hübner, [1823] (*Papilio demodocus* Esper, 1798). *Carcharodus* Hübner, [1823] and *Spilothyrus* Duponchel, 1835 (*Papilio fritillarius* Poda, 1761); A.

C. W. STILES,
Acting Secretary, International Commission on Zoological Nomenclature.

May 1, 1936
U. S. National Museum
Washington, D. C.

# Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within ( ) follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first installments.

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

*Papers published in the Entomological News are not listed*

## New Titles of Periodicals and Serials Referred to

14. Archivos do Instituto Biologico, Sao Paulo.

**GENERAL.—Armstrong & Carpenter.**—Insect coloration. [31] 138: 242-243. **Berger, L.**—Nomenclature, simplifications ou complications? [Lambillionea] 1936: 123-126. **Bryson, H. B.**—Technique for rearing subterranean insects. [103] 9: 73-84, ill. **Carrick, R.**—Experiments to test the efficiency of protective adaptations in insects. [36] 85: 131-140, ill. **Clausen, C. P.**—Insect parasitism and biological control. [7] 29: 201-223, ill. **da Costa Lima, A. M.**—Terceiro catalogo dos insectos que vivem nas plantas do Brasil. Rio de Janeiro, Brazil. 460 pp. Insectos do Brasil. [O Campo R. d. Janeiro] 1935: Aug. p. 20-24, Sept. p. 26-27, Oct. p. 11-15, Nov. p. 31-35, Dec. p. 11-19, 1936: Jan. 14-18, Mar. p. 17-23, Apr. p. 12-16, cont. **Crabb, E. D.**—Faulty titles of zoological papers. [Univ. Colo. Studies] 23: 293-304. **Creighton, J. T.**—Newell Entomological Society. [12] 29: 634. **Felt & Rankin.**—Insects and diseases of ornamental trees and shrubs. Macmillan Co., New York, 1936. xix + 507 pp., ill. **Flanders, S. E.**—A biological phenomenon affecting the establishment of Aphelinidae as parasites. [7] 29: 251-255. **Fletcher, T. B.**—Stridulation in insects. [107] A, 11: 68. **Geiser, S. W.**—A century of scientific explora-

tion in Texas. Part 1. 1820-80. [Field & Laboratory] 4: 41-55. **Hayward, K. J.**—Six months Collecting along the Alto Parana, Argentina. [Proc. & Trans. S. London Ent. & N. H. Soc.] 1935-36: 55-83, ill. **Holik, O.**—A propos de l'emploi des designations "minor," "nana," "minuscula. [Lambillionea] 1936: 148-149. **Jaeger, E. C.**—The California deserts. A visitor's handbook. Chapter 5. Insects and their near relatives. [Stanford Univ. Press] 207 pp., ill. **Jeannel, R.**—Anciennete des insectes. [Rev. Franc. Ent.] 3: 101-106. **McLaine, L. S.**—A new phase of insect distribution by means of flood waters. [4] 68: 141. **Mellanby, K.**—Humidity and insect metabolism. [31] 138: 124-125. **Pearse, A. S.**—The migrations of animals from sea to land. [Duke Univ. Press.] 176 pp. **Pratt, J. G.**—Photomicrography of opaque objects. Overcoming the big obstacle-lack of depth of focus. [Amer. Photography] 1936: 348-354, ill. **Tietz, H. M.**—A novel light trap. [12] 29: 462, ill. **Weiss, H. B.**—Entomologists and entomological publications. [12] 29: 635-636. **Wolcott, G. N.**—"Insectae Borinquenses." A revised annotated check-list of the insects of Puerto Rico. With a host-plant index by J. I. Otero. [Journ. Agr. Univ. Puerto Rico] 20: 1-627, ill. **Wormser & Hayes.**—The permanent preservation of insects. [19] 31: 111-128, ill.

**ANATOMY, PHYSIOLOGY, ETC.—Alexandrov, W. J.**—Permeability of chitin of some dipterous larvae and the method of its study. [Acta Zool.] 16: 1-19. **Anderson, W. H.**—A comparative study of the labiumof coleopterous larvae. [Smithson. Misc. Coll.] 95, no. 13, 38 pp., ill. **Andre & Pratt.**—The toxicity of certain stomach poisons to the June beetle, Phyllophaga implicita. [Iowa St. Coll. Journ. Sci.] 10: 243-248. **Berge, S.**—A new hereditary deformation of thorax of Drosophila melanogaster. [Meldinger Norges Landbrukshiskole] 16: 470-486, ill. **Dreher, K.**—Bau und Entwicklung des Atmungs-systems der Honigbiene (Apis mellifica). [46] 31: 608-672, ill. **Eggers, F.**—Kritische Bemerkingen zur Halterenfrage. [34] 115: 186-190. Das Frommelfeltschutzgitter bei Calocampa. [34] 115: 212-217, ill. **Evans, A. C.**—Histolysis of muscle in the pupa of the blow-fly Lucilia sericata. [107] A, 11: 52-54, ill. **Glover & Richardson.**—The penetration of gaseous pyridine, piperidine and nicotine into the body of the American cockroach, Periplaneta americana. [Iowa St. Coll. Journ. Sci.] 10: 249-260. **Gontarskai, H.**—Die wachserzeugung der Ar-

beiterinnen von Apis mellifica während der winterruhe. [94] 147: 526-536. **Herms & Wheeler.**—Ornithodoros hermsi as a vector of relapsing fever in California. [Jour. Parasitol.] 22: 276-282. **Ichijo, F.**—Studies on the internal flora of normal larvae of cabbage moth (Barathra brassica) [Bull. Utsunomiya Agr. Coll.] Sect. A, 2: 127-142 [in Jap. with Engl. summ.] **Janda, V.**—Ueber den Farbwechseltransplantierter Hautstücke und künstlich verbundener Korperfragmente bei Dixippus morosus (Orthop.) [34] 115: 177-185, ill. **Jillon Pu.**—Unrecorded glans in the mouth parts of Hydrophilidae (Col.). [Pekin Nat. Hist. Bull.] 10: 353-359, ill. **Kaliss & Graubard.**—The effect of temperature on oviposition in Drosophila melanogaster. [92] 70: 385 391. **Kaston, B. J.**—The senses involved in the courtship of some vagabond spiders. [70] 16: 97-167, ill. **Key, K. H. L.**—Rate of locomotion in relation to starvation in Locusta migratoria migratoroides. [107] A, 11: 3-6. **Kuster, K. C.**—Distributional variation of the ganglionic tracheae in the larvae of Odontomyia cincta (Dipt.) [114] 21: 639-650, ill. **de Lepiney, L.**—Sur "L'Instinct educateur" d'Eumenes maxillosus (Vespidae). [Bull. Soc. Sci. Nat. Maroc] 16: 6-14, ill. **Machotin, A.**—Zu den Reduktionserscheinungen in der Morphologie des Erwachsen Frostspanners (Operophthera brumata). [C. R. Acad. Sci. URSS] 2: 401-404, ill. **Oevermann, H.**—Das statische verhalten einiger wasserwanzenarten. [94] 147: 595-628, ill. **Parks, Hal B.**—Cleavage patterns in Drosophila and mosaic formation. [7] 29: 350-392, ill. **Pumphrey & Rawdon-Smith.**—Sensitivity of insects to sound. [31] 137: 990. **Susskind, M. E. C.**—A morphological study of the respiratory system in various larval instars of Stenelmis sulcatus (Dryopidae). [114] 21: 697-714, ill. **Thienemann, A.**—Chironomiden—Metamorphosen. XI. Die Gattung Eukiefferiella. [60] 97: 43-65, ill. **Thomas, M.**—L'Instinct chez les Araigness. XXVI. La vue et la sensibilite tactile. [33] 76: 147-160. **Tokunaga, M.**—Central nervous, tracheal and digestive systems of a nymphomyrid fly. [Phil. Jour. Sci.] 59: 189-216, ill. **Travis, B. V.**—Relative toxicity of certain stomach poisons to Phyllophaga lanceolata (Coleop.) [Iowa St. Coll. Journ. Sci.] 10: 235-241, ill. **Vachon, M.**—Sur le developpment postembryonnaires Pseudoscorpions. [Bull. Mus. Hist. Nat. Paris] 8: 77-83. **Wells, F. L.**—Orbweavers' differential responses to a tuning fork. [5] 43: 10-13. **Yokoyama, T.**—Histological observations on a non-moulting strain of silkworm. [107]

A, 11: 35-44, ill. **Zavrel, J.**—Endokrine Hautdrüsen von Syndiamesa branicki (Dipt.) [Publ. Fac. Sci. Univ. Masaryk, Brno] No. 213, 18 pp., ill. **Zeuner, F. E.**—The prothoracic tracheal apparatus of Saltatoria. [107] A, 11: 11-21, ill.

**ARACHNIDA AND MYRIOPODA.—Bonnet, P.**—Nouvelle recherchez sur les griffes des pattes de araignees. [Bull. Soc. Hist. Nat. Toulousel] 67: 346-352, ill. Theridion tepidariorum, araignee cosmopolite, repartition—cycle vital—moeurs. [Bull. Soc. Hist. Nat. Toulouse] 68: 335-386, ill. Araignees males a palpe unique. [Bull. Soc. Hist. Nat. Toulouse] 68: 411-414, ill. **Chamberlin, R. V.**—Further records and descr. of N. Am. Gnaphosidae. [40] 853: 25 pp., ill. **Chickering, A. M.**—Families of spiders of Michigan. [114] 21: 575-586, ill. **del Cid, G.**—Introduccio a l'estudi elemental des Aracnids. [Arxius, Barcelona] 2: 145-158, ill. **Exline, H.**—New and little known sps. of Tegenaria (Agelenidae). [5] 43: 21-26, ill. **Gertsch, W. J.**—Further diagnoses of new American spiders. [40] 852: 27 pp., ill. **Gertsch & Ivie.**—Descriptions of new American spiders. [44] 858: 25 pp., ill. **Gertsch & Mulaik.**—New spiders from Texas. [40] No. 863: 1-22, ill. **Herms & Howell.**—Western dog tick, Dermacentor occidentalis, a vector of bovine anaplasmosis in Calif. [Jour. Parasitol.] 22: 283-288. **Jacot, A. P.**—Three undescribed Pediculoidid mites from the southern Appalachians. [4] 68: 129-133, ill. **Lundblad, O.**—Die nordamerikanischen arten der gattung Hydrachna. [83] 28 (A): 1-44, ill. (*). **McClure, H. E.** (See Orthoptera).

**THE SMALLER ORDERS OF INSECTS.—Bailey, S. F.**—Thrips attacking man. [4] 68: 95-98. **da Cuna, L. A.**—Bicho do pe. [O Campo R. d. Janeiro] Feb. 1936: p. 16, ill. **Dustan, A. G.**—The synonymy of the gladiolus thrips. [4] 68: 141. **Ewing, H. E.**—The taxonomy of the Mallophagan fam. Trichodectidae, with special reference to the new world fauna. [J. Parasitology] 22: 233-246, ill. (*). **Frison, T. H.**—Some n. spp. of stoneflies from Oregon. [7] 29: 256-265, ill. **Hood, J. D.**—Nine new Thysanoptera from the United States. [6] 44: 81-100, ill. Studies in Neotropical Thysanoptera. [105] 6: 248-279, ill. (*). Two new Anactinothrips from South America (Thysanoptera). [107] B. 5: 143-147, ill. Two new Thysanoptera from the United

States. [5] 43: 1-9, ill. **Milne, L. J.**—Studies in North American Trichoptera, 3. 73 pp., ill. (*). **Mosely, M. E.**—A revision of the Triplectidinae, a subf. of the Leptoceridae (Trichoptera). [36] 85: 91-130, ill. (*). **Moulton & Andre.**—Four new Thysanoptera, with a preliminary list of the sps. occurring in Iowa. [Iowa St. Coll. Journ. Sci.] 10: 223-234, ill. **Needham & Fisher.**—The nymphs of North American Libelluline dragonflies. [1] 62: 107-116, ill. **Thompson, G. B.** (See under Diptera).

**ORTHOPTERA.—Ebner, R.**—Die Larven von Paracycloptera (Tettigoniidae). [105] 6: 191-194, ill. **Hamilton, A. G.**—On an abnormality of the eighth abdominal segment in females of Locusta migratoria. [107A] 11: 29-32, ill. **Hebard, M.**—New genera and species of Melanpoli found within the United States and Canada (Acrididae). Parts 7-9. [1] 62: 167-222, ill. **Husain, M. A.**—Studies in Schistocerca gregaria. II. The biology of the desert locust with special relation to temperature. [Indian Jour. Agr. Sci.] 6: 188-262. **Husain & Mathur.**—Studies in Schistocerca gregaria. III. Why locusts eat wool. [Indian Jour. Agr. Sci.] 6: 263-267. **Key & Edney.**—Precocious adults resulting from the omission of the fifth instar in Locusta m. migratorioides. [107] A, 11: 55-58, ill. **McClure, H. E.**—An odd hibernaculum. [5] 43: 19. **Rehn & Rehn.**—On new or redefined genera of Melanopli (Acrididae). [1] 62: 1-30, ill. **Severin, H. C.**—Additions to Hebard's list of Orthoptera of South Dakota, with observations on some previously reported species. [103] 9: 85-93. **Toleda Piza, Jr., S.**—Os Phasmidas do Museu Paulista. I. Phasmidae, Bacillinae. [105] 6: 280-292, ill. (*). **Zeuner, F. E.**—The subfamilies of Tettigoniidae. [107] B, 5: 103-109.

**HEMIPTERA.—Davis, W. T.**—A remarkable cicada from Mexico and other North American species. [6] 44: 101-119, ill. (*). **Drake & Harris.**—Notes on some American Gerrids. [83] 28 (B): 1-4, ill. (*). **Ferris, G. F.**—Contributions to the knowledge of the Coccoidea. II. Illustrations of sixty-one genotypes of the Diaspididae. [Microentomology] 1: 17-92, ill. **Knowlton & Smith.**—Capitophorus Aphids infesting Chrysothamnus. [4] 68: 107-113, ill. (*). The Aphid genus Epameibaphis in Utah. [10] 38: 89-92, ill. (*). **Oman, P. W.**—A new Poblicia from Texas (Fulgoridae). [103] 9: 105-107. **Palmer, M. A.**—Four new

aphids from Colorado. [7] 29: 273-278, ill. **Roba, R. P.**—Un nouveau Coccide signale sur Cafeier. [33] 76: 297-298. (S).

**LEPIDOPTERA.—Biedermann, R.**—Une forme nouvelle de Prepona praeneste (Nymphalidae). [25] 41: 125-126. (S*). Formes nouvelles de Rhopaloceres sud-Americains. [Rev. Franc. Ent.] 3: 174-176, ill. **Bouvier, E. L.**—Etudes des Saturnoides normaux fam. Hemileucides. [Ann. Sc. Nat. Paris] Zool. 19: 267-428, ill. (S*). **Brower, A. E.**—Description of a n. sp. and a n. f. of Catocala. [19] 31: 96-98, ill. **Bryk, F.**—Lepidopterorum Catalogus. Pars 71. Zygaenidae II. 95-332. **Doner, M. H.**—(See under Hymenoptera). **Draeseke, J.**—Lepidoptera Catalogus. Pars 72. Lycaenidae I. 48 pp. **Field, W. D.**—New North American Rhopalocera [13] 28: 17-26. **Klots, A. B.**—New North American Microlepidoptera. [40] No. 867: 1-6, ill. **Koehler, P.**—Nuevos Agaristidae argentinos. [69] 12: 71-73, ill. **Lichy, R.**—Dos lepidopteros nuevos para Venezuela. [Bol. Soc. Venezolana Cien. Nat.] 3: 204-209, ill. **McDunnough, J.**—A new race of Glaucopsyche lygdamus from the White Mts., Arizona (Lycaenidae). [4] 68: 113. **Prout, L. B.**—Lepidopterorum Catalogus. Pars 68. Geometridae: Subfam. Sterrhinae III. 433-486. **Schüsser, H.**—Lepidopterorum Catalogus. Pars 70. Syssphingidae. 230 pp. **Shepard, H. H.**—Lepidopterorum Catalogus. Pars 74. Hesperidae: Subfam. Pyrginae IV. 561-679.

**DIPTERA.—Autuori, M.**—Uma n. sp. do gen. Anastrepha (Trypetidae). [105] 6: 194-196, ill. (S). **Bromley, S. W.**—Asilids feeding on bumblebees in New England. [5] 43: 14. **Burtt, E. T.**—Description of a new type of larval respiratory organ in Atrichopogon trifasciatus (Ceratopogoninae). [107] A, 11: 61-65, ill. **Collado, J. G.**—Culicidos de la Isla de Fernando Poo recogidos por la expedicion J. Gil-F. Bonet. [EOS] 11: 311-329, ill. (*). **Duda, O.**—Ergebnisse einer zoologischen Sammelreise nach Brasilien, insbesondere in das Amazonasgebiet, ausgeführt von Dr. H. Zerny. XI Teil. Diptera: Chloropidae. [Ann. Naturhist. Mus. Wien] 47: 107-113 (*). **Frost, S. W.**—New Central American Agromyzidae. [7] 29: 298-318. **Hendel, F.**—Ergebnisse einer zoologischen Sammelreise nach Brasilien, insbesondere in das Amazonasgebiet, ausgefuhrt von Dr. H. Zerny. X Teil. Diptera: Muscidae acalyptratae (excl. Chloropidae). [Ann. Naturhist. Mus. Wien] 47: 61-106, ill.

(*). **James, M. T.**—Notes on Nemotelus (Stratiomyidae). [19] 31: 86-91 (*). A proposed classification of the nearctic Stratiomyinae. [1] 62: 31-36, ill. **Komp, W. H. W.**—Description of nine n. spp. of Culex, seven from Panama and two from Venezuela. Culicidae). [7] 29: 319-334, ill. **Lindner, E.**—Stratiomyiiden von Costa Rica. [60] 97: 153-158 (*): **Pessoa & Galvao.**—Novo genero e nova especie de Streblidae, parasita de morecgo do Brasil. [105] 6: 242-248, ill. **Philip, C. B.**—New Tabanidae with notes on certain species of the longus-Group of Tabanus. [43] 36: 149-156 (*). A new horsefly from the southeastern United States. [103] 9:100-101. Tabanus rhombicus and related western horseflies. [4] 67: 148-160 (*). **del Rosano, F.**—American sps. of Psychoda. (Psychod.). [Phil. Jour. Sci.] 59: 85-148, ill. (*). .**Thompson, G. B.**—Some additional records of an association between Hippoboscidae and Mallophaga, together with a bibilography of the previous records. [75] 18: 309-312. **Townsend, C. H. T.**—Manual of Myiology. 1936. Part III. 249 pp.

**COLEOPTERA.—Bierig, A.**—Paederinae: nuevos neotropicales con notas sobre formas ya conocidas. (Staphylin.). [115] 10: 137-144, ill. **Blaisdell, F. E.**—Studies in the tenebrionid tribe Triorophini. A monographic revision of the sps. belonging to the g. Stibia. [1] 62: 57-105, ill. Two n. spp. of Notoxus (Anthicidae). [4] 67: 144-148. **Borgmeier, T.**—Ecitotropis, un n. gen. myrmecophilo da familia Staphylinidae de Goyaz. [105] 6: 296-299, ill. **Brown, W. J.**—American species of Ludius; the fallax and triundulatus groups (Elateridae). [4] 68: 99-107, ill. (*). American species of Ludius: the inflatus Group. [4] 68: 133-136, ill. (*). **Bryant, G. E.**—A n. sp. of Epitrix (Halticinae) injurious to tobacco in Brazil. [110] 3: 114. **Buchanan, L. L.**—A new g. and 4 n. sps. of West Indian Curculionidae. [115] 10: 145-152. **von Dalla Torre & van Emden.**—Coleopterorum Catalogus. Pars 147. Curculionidae: Brachyderinae I. 132 pp. **Dibb, J. R.**—A n. sp. of Passalidae from Mexico. [107] B, 5: 129-130, ill. **Fiedler, C.**—Die amerikanischen Rüsslergattung Cryptacrus (Curculionidae) [2] 32: 117-125 (S*). **Guignot, F.**—Description d'Haliplus nouveaux (Haliplidae). [25] 41: 115-118 (S*). **Guignot, F.**—Deux Clypeodytes nouveaux du Mexique (Dytiscidae). [Rev. Franc. Ent.] 3: 144-146, ill. **Hinton, H. E.**—Studies in the Mexican and Central American Eupariini (Scarab.).

[67] 6: 273-276, ill. **Hustache, A.**—Piazurus nouveaux (Curculionidae). [25] 41: 106-112 (S*). **Klima, A.**—Coleopterorum Catalolgus. Pars 146: Curculionidae: Cholinae, Tachygoninae, Antliarrhininae, Ulomascinae, Epipedinae, Pyropinae. 32 pp., 1-4; 1-2; 1; 1. **Liebke, M.**—Neue Carabiden aus Argentinien. [105] 6: 300-304. **Linsley, E. G.**—Studies in the g. Aulicus Spinola (Cleridae). [67] 6: 249-262, ill. **McKenzie, H. L.**—An anatomical and systematic study of the g. Anatis of America (Coccinel.). [67] 6: 10 pp., ill. **Obenberger, J.**—De novis agrili generis regionis neotropicae speciebus (Bupr.). [Acta Ent. Mus. Prague] 13: 108-140. **Obenberger, J.**—Synonymia Agrilorum (Buprestidae). [Casopis] 32: 59-121 (*). **Perkins, R. C. L.**—Disenochus munroi, a new Hawaiian beetle (Carabid.). [8] 72: 177. **Ray, E.**—Studies on North American Mordellidae. [4] 68: 124-129, ill. (*). **Reichensperger, A.**—Beitrag zur Kenntnis der Myrmecophilen- und Termitophilenfauna Brasiliens und Costa Rica IV. (Hist. Staphyl. Pselaph.). [105] 6: 222-242, ill. (*). **Saylor, L. W.**—Four new Neotropical Melolonthids (Scarabaeidae). [105] 6: 293-296. **Van Zwaluwenberg, R. H.**—A n. sp. of Pyrophorus (Elateridae) from Guatemala, recently introduced into Hawaii. [37] 9: 231-234, ill.

**HYMENOPTERA.—Bromley, S. W.**—(See under Diptera). **Brues, C. T.**—An American species of Solenopsia (Diapriidae). [5] 43: 15-18, ill. (*). **Bryant, G. E.**—A n. sp. of Epitrix (Halticinae) injurious to tobacco in Brazil. [110] 3: 114. **Compere, H.**—Notes on the classification of the Aphelinidae, with descr. of n. spp. [67] 6: 277-322, ill. **Doner, M. H.**—Hymenopterous parasites of Coleophora pruniella, and parasites recorded from other spp. of Coleophora. [7] 29: 224-244. **Eidmann, H.**—Ökologisch-faunistiche Studien an südbrasilianischen Ameisen. [110] 3: 81-114, ill. (*). **Gahan, A. B.**—Four n. sp. of Chalcidoidea parasitic on cactus insects. [50] 83: 481-486. **Michener, C. D.**—Some bees of the genus Halictus. [75] 18: 281-289. (*). Some North American Osmiinae (Apoidea). [40] No. 875, 30 pp., ill. (*). Some western Anthophoridae. [19] 31: 92-95. (*). **Mickel, C. E.**—Two n. gen. and five n. spp. of Mutillidae. [7] 29: 289-297, ill. **Mitchell, T. B.**—A revision of the genus Megachile in the nearctic region. IV. Taxonomy of subgen. Xanthosarus, Phaenosarus, Megachiloides and Derotropis (Megachilidae). [1] 62: 117-166, ill.

**Pate, V. S. L.**—New Neotropical species of Bicyrtes (Sphecidae). [105] 6: 219-221. Studies in the Nyssonine wasps. (Sphecidae). 1. The species of Psammaletes, a new subgen. of Hoplisoides. [1] 62: 49-56. **Santschi, F.**—Contribution a l'etude des fourmis de l'Amerique du Sud. [105] 6: 196-218. (*).

**SPECIAL NOTICES.—A Monograph** of the British Neuroptera. By F. J. Kellington. Vol. 1. 269 pp., ill .[Ray Soc., London). **Plant Protection** Lenin Academy of Agricultural Sciences in USSR, Institute of Plant Protection. Fasc. 1-, 1935. Each fasc. is separately paged all in Russian, but contents also given in English. Mostly papers on pests and their control. Not otherwise cited in this list.

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THE GENITALIA OF THE TINEINA. By F. N. PIERCE and Rev. J. W. METCALFE, 1936, pp. 116, 68 plates. (Published by F. N. Pierce at Oundle, Hampshire, England.) There is probably an increasing number of people who are interested in scientific pursuits as a hobby, but are not satisfied with merely making collections of specimens. They have more ambitious aims, they would like to make positive contributions to scientific knowledge. What can they do? There is urgent need for more workers in taxonomy, but the revision of groups of insects is no easy matter. Such work, or even the description of new species, requires time and experience, and large resources in the way of collections and literature. It may often be a good plan for a young worker to concentrate on some relatively small group, and one could cite many cases in which this has been done with good results. But there are two types of work which are in themselves fruitful, and at the same time do not require large libraries or other facilities. One is the observation of habits and life histories, a practically inexhaustible field, too little cultivated in this country. Fabre, who made no pretence of being an expert taxonomist, wrote fascinating books on the behaviour of insects. Peckham, no specialist on Hymenoptera, described the nesting of wasps in what we now regard as a sort of classic. For such workers, dealing necessarily with relatively few species, it is usually possible to find experts who will determine the species. The other type may be described as comparative morphology, leading to the discovery of structures which shed new light on evolution and classification, and often on general biological problems. For this work it is necessary to have series of accurately identified specimens; but if

this was formerly an obstacle, it is less so today, since the various museums and private collections have accumulated vast numbers of duplicates which can readily be spared for anatomical studies. The work is laborious, but very interesting, and any one who has tried it will be surprised to find how many structures there are in an insect, which the ordinary taxonomist has never observed. Perhaps the greatest difficulty concerns the illustrations, which require skill in drawing, and are expensive to publish. There is a new process, however, which cuts down the cost of publishing figures very considerably.

A leading worker in this morphological field is Mr. F. N. Pierce, whose studies of the genitalia of European Lepidoptera have done much to clarify the conception of genera and species, and have been a standing challenge to those old fashioned lepidopterists who recognized only the obvious external characters. He has now extended these studies to the "micros," where they are most needed, and after publishing an account of the Tortricidae (1921), has had the courage to attack that vast complex the Tineina or Tineoidea. So far as possible, all the British species are dealt with, with a figure of the genitalia of each, and a short description (abbreviated as much as possible on account of the cost of printing). In the course of the work, no less than seven species (four new) have been added to the British lists. Some generic revisions are suggested, but the authors have felt that some specialist who knew the genera of the world should follow up their suggestions, and make the revisions which appeared desirable. In a few cases, pairs of supposed species have proved identical, but when the genitalic characters were found to be recognizable though slight, the species were accepted as valid. There are a few cases in which the genitalia show no differences, yet other characters (notably those derived from the life history) indicate that the species concerned are really different. A noteworthy example of this sort is afforded by *Yponomenta padellus* and *Y. malinellus*. The writer of this review is, of course, wholly incompetent to discuss the details, but he is greatly impressed by the magnitude of the work, the care with which it has been done, and its obvious great importance to lepidopterists all over the world. It is also evident that similar studies on other faunae will be most fruitful of interesting results.—T. D. A. COCKERELL.

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Prof. W. M. Wheeler, emeritus professor of entomology at Harvard University, has been elected an honorary fellow of the Royal Society of Edinburgh, according to *Science* for July 31, 1936.

A MONOGRAPH OF THE BRITISH NEUROPTERA by FREDERICK JAMES KILLINGTON, Editor of the Transactions and Journal of the Society for British Entomology. Vol. I, pp. xix, 269, 68 text figures, 15 plates. London Printed for the Ray Society. Sold by Bernard Quaritch, Ltd., 11 Grafton St., New Bond St., London, W. I. 1936. This volume (No. 122 of the Series) is issued to the subscribers to the Ray Society for the year 1935. Price 25 shillings.—This book is of importance to students of Neuroptera in all parts of the world by reason of its detailed account of the morphology of adult and immature stages of these insects. Chapter I, The Imago, consists of 67 pages, of which 59 (or more than one-fifth of the whole text) deal with the external morphology, the remaining 8 with the internal morphology. In treating of the exterior of the body, the Hemerobiidae have been selected for a more detailed account, "mainly for two reasons: firstly, because it includes approximately half of the British genera and species of Neuroptera; secondly, because the sclerites are for the most part well chitinized and pigmented and consequently, except in one or two regions, well defined." Following the morphology of the Hemerobiidae, that of the Coniopterygidae, Osmylidae, Sisyridae and Chrysopidae is more briefly considered. Chapter 2 is on the egg (12 pages), Chap. 3 on the larva (35 pages), Chap. 4 on the pupa (13 pages), Chap. 5 on bionomics (43 pages). Adding to these the Introduction (12 pages), we have a total of 182 pages and 54 text figures constituting the general part of this book. "In all British Neuroptera there are constantly three [larval] instars, and, in fact, this is true of all Neuroptera with the exception of the Australian Ithonidae, in which family Tillyard (1922*b*) states there are five." One of the best known and interesting features of the larva is the suctorial mandibles and maxillae. After reviewing the opinions of authors on the morphology of the terminal blade of the maxillary, Killington inclines to that of Withycombe, that it corresponds to the lacinia (p. 104). Special features of the chapter on bionomics are the tables showing the habitats, the monthly distribution throughout the year, the prey and the Hymenopterous parasites of each species. The longest known life-cycle of any of the British species "does not exceed twelve months, and in the majority of species is considerably less than this. . . . The number of broods varies, with the species, from one to several in a year or there may be a succession of broods throughout the entire year (*Hemerobius stigma*)" (pp. 147, 146). The list of British Neuroptera, pages 10-12, embraces 18 genera and 53 species

(Coniopterygidae 5, 7; Osmylidae 1, 1; Sisyridae 1, 3; Hemerobiidae 9, 28; Chrysopidae 2, 14. The American student will note that there are no Myrmeleonidae). Chap. 6, 87 pages, describes the first 10 genera and 15 species, leaving the remainder for Volume II. The beautifully clear text figures and five of the plates are line engravings, the remaining plates halftones, four of them showing the wings of Hemerobiids in colors from the author's drawings.—P. P. CALVERT.

ANCIENT ARTIZANS. The Wonders of the Insect World. STUART WARD FROST. Boston, The Van Press. 1936. 295 pp., 152 figures. $3.50. Here we find a work concerned with interesting habits of some insects, bringing together under one cover much that is scattered and almost lost in scientific volumes and beyond reach of the ordinary reader. These accounts are told in a readable fashion with illustrations of a few of the outstanding insects. Scientific names are referred to in footnotes. The studies have been taken largely from common species that can be seen by anyone who will take the time to pause and observe. The author, acting on a suggestion of a well known student of entomology that insects passed through development stages similar to that of man, has divided the work into chapters treating of the insects, illustrating such stages. Of these he recognizes foragers, nomads, hunters, agriculturists, masons, carpenters, spinners, weavers, miners, aviators, divers, musicians, assassins and fishermen. The examples as a rule are well taken and each chapter gives ample references for further study. The work should appeal to all interested in the rôle of insects in nature.—E. T. C.

**Change of Name (Diptera: Syrphidae).**

In the Transactions of the American Entomological Society, volume LVI, page 146 (1930) I described a new genus of Syrphid fly which I called *Cacomyia,* overlooking the fact that a genus had been already erected in Diptera bearing this name. Therefore, I propose the name *Cacoceria* for the species of fly I describe as *Cacomyia,* with, for the genotype of *Cacoceria,* the original species *cressoni* n. sp.—FRANK M. HULL.

The International Health Division of The Rockefeller Foundation in 1935 operated on a budget of $2,200,000. Grants were made for yellow fever studies in Brazil; for research on yellow fever, malaria, and other diseases at the laboratories of

the International Health Division at the Rockefeller Institute; for field research on malaria in Cuba, Puerto Rico, Albania, Bulgaria, Greece, Italy, Portugal, Spain, and India, and for laboratory studies of this disease at the University of Chicago; for demonstrations in the control of malaria in Colombia, Nicaragua, Salvador, and Albania.

## OBITUARY

ALBERT PITTS MORSE, of Wellesley, Massachusetts, a student of the Orthoptera and the Odonata, died April 29, 1936, at the age of seventy-three. For many years a member of the faculty of the Wellesley College, and later Curator of Natural History at the Peabody Museum at Salem, Massachusetts, he left an enduring monument in his "Manual of the Orthoptera of New England," probably as fine a regional entomological study as has been produced in America. A summary of Mr. Morse's many activities, accompanied by an excellent portrait, has been presented by Dr. Richard Dow in the July issue of the "Bulletin of the New England Museum of Natural History," published by the Boston Society of Natural History.

A biographical notice of CHARLES ROBERTSON, who died at Carlinville, Illinois, June 17, 1935, by H. B. Parks, appeared in Bios (the quarterly of the Beta Beta Beta Biological Fraternity, Oklahoma City), Vol. 7, no. 2, pages 85-96, May, 1936. Robertson was born June 12, 1858, studied at Blackburn University (now College) and at Harvard. He taught biology at Blackburn, 1880-1886 and 1898-1910. Impressed by Herman Müller's *Die Befruchtung der Blumen durch Insekten*, he planned an investigation of this subject for the Carlinville area; his papers on this topic began in 1886 and continued to 1931. The nature of his studies compelled him to devote much attention to the taxonomy of the Hymenoptera and to describe many new species of bees. A bibliography of his writings, of 148 titles, accompanies Dr. Park's biography; twenty of these appeared in the NEWS.

# EXCHANGES

**This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.**

**These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.**

**Wanted**—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, Samia, Columbia or hybrid with S. Cecropia, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

**Wanted**—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

**Wanted**—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

**Wanted**—Dr. Karl Eller of the Zoological Institute, of the University of Munich, who is at present engaged in a critical study of the races of **Papilio machaon** and related species, particularly desires to secure for study, as loans or otherwise, material of the American representatives of this group. To be of service to him material must bear exact localities, altitudes when possible, and dates of capture. Dr. Eller has largely completed his work in the Old World forms and requests the cooperation of American students so that his investigations may be of broadly comprehensive character.

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